

Cassini / Huygens Program

Archive Plan

for Science Data

PD 699-068

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National Aeronautics and Space Administration
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Archive Plan for Science Data, 699-068

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Archive Plan for Science Data, 699-068

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Archive Plan for Science Data, 699-068

Change Record for 699-068

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Draft 3	9/16/98	New organization -- Updated signature page, replaced references to SO and DOI with the new "Instrument Operations Team", replaced references to MSO and Science Office with "Science Operations Office" Section 2, item 2 -- states that Cassini provides volumes to PDS CN who in turn provides copies to the relevant PDS DNs. It should be noted that this is still listed as a TBD Incorporated PDS comments	All
Draft 4	10/5/98	Section 2, item 5 Added cruise archive policy & included in delivery of cruise science in Archive schedule OTLs and MSOCs listed as archive contacts for each instrument	All
Preliminary	4/1/99	Changed document title Revised signature page Changed instances of "Cassini Project" to "Cassini Program" Updated applicable document listing	All
Preliminary V1	12/27/99	Updated Signature page Major changes to Roles and Responsibility section 2.0 Some changes to policy section 3.0 Review and comment on To be Supplied list Formatting changes	All
Preliminary V2	4/1/00	Incorporated updates throughout the document as requested by reviewers. Incorporated Huygens data in the plan. Updated distribution list. Updated archive policies.	All

Table of Contents

1. Introduction	1
1.1 Purpose	1
1.2 Scope	1
1.3 Applicable Documents	1
1.4 Document Change Control	2
1.5 Terms and Definitions.....	2
1.5.1 Archive Terms Defined.....	2
1.5.2 Data Product Levels.....	3
2. Roles and Responsibilities.....	4
2.1 Project Scientist.....	4
2.2 Principal Investigators (PIs), Team Leaders (TLs)	4
2.3 Interdisciplinary Scientists (IDSs).....	4
2.4 Instrument Operations (IO).....	5
2.5 Mission Support and Services Office (MSSO).....	5
2.6 Spacecraft Operations (SCO).....	5
2.7 Planetary Data System (PDS).....	6
2.8 National Space Science Data Center (NSSDC).....	6
2.9 Cassini PDS Archive Locations.....	7
2.10 Cassini Principal Investigators and Team Leaders (PIs/TLs) Archive Contact.....	8
2.11 Huygens Principal Investigator Archive Contacts.....	9
2.12 Cassini MSSO SPICE Archive Contact	10
2.13 PDS Discipline Nodes responsible for archiving Cassini data.....	10
3. Archive Data Flow Diagram	11
4. Archive Policies.....	13
5. PDS High-Level Catalog Templates.....	14
6. Science Data Archive Products.....	14
6.1 Documentation.....	14
6.2 Level 0 Data.....	14
6.3 Level 1 Science Data Products.....	14
6.4 Higher Level Science Data Products	15
6.5 PIO/Press Release Data Products.....	15
6.6 Ancillary or Supplementary Data Products	15
6.6.1 SPICE Products and NAIF Toolkit	15
6.6.2 Uplink Data Products.....	15

Archive Plan for Science Data, 699-068

Appendix A. Science Data Sets for Archive to PDS.....	16
Appendix B: Supplementary Data Sets for Archive to PDS.....	21
Appendix C. Archive Schedule	25
Appendix D: Acronyms	26
Appendix E: To be Resolved List.....	28

1. Introduction

1.1 Purpose

The purpose of this document is to describe the Cassini / Huygens science data archive system which includes policy, roles and responsibilities, description of science and supplementary data products or datasets, metadata, documentation, software, and archive schedule and methods for archive transfer to the NASA Planetary Data System (PDS).

1.2 Scope

This document is applicable to all science and supplementary data resulting from the Cassini Program orbiter and Huygens Science Working Team investigations. This document is subordinate to the Cassini Program Data Management Plan and Science Management Plan.

1.3 Applicable Documents

The Archive Plan for Science Data (APSD) is responsive to the following documents found on-line in the Master Controlled Document Library at <http://cel.jpl.nasa.gov/cedr/home/mcdl.html>

- a) Cassini Operations System Functional Requirements Document, 699-500-3-GS/R
- b) Cassini Program Science Management Plan (SMP), PD 699-006, July 1999.
- c) Cassini Program Data Management Plan (PDMP), PD 699-061, Rev.B, April 1999.
- d) Cassini/Planetary Data System Interface Requirements Document (MSO - PDS IRD), PD 699-108, Rev. B, 14 April 1998.

The following additional documents are referred to in the APSD. PDS documentation is available on-line from the PDS Website at <http://pds.jpl.nasa.gov/>.

- a) Planetary Data System Data Preparation Workbook (PDS DPW), Version 3.1, 17 February 1995, JPL D-7669, part 1.
- b) Planetary Data System Data System Standards Reference, Version 3.2, 24 July 1995, JPL D-7669, part 2.
- c) Planetary Science Data Dictionary Document, Revision D, 15 March 1996, JPL D-7116.

1.4 Document Change Control

The APSD is under change control once all parties sign it. All the parties on the signature page must approve each revision.

1.5 Terms and Definitions

1.5.1 Archive Terms Defined

For this document the following terms are defined.

archive - a preservation of data for future use. Mission archives occur during the term of the mission, long-term archives are maintained at the PDS.

data product - an electronic file or hardcopy containing data.

metadata - a label or file that describes science data products.

data set - a collection of associated data, metadata, documentation and software.

archive medium - a physical device for storing data such as CD, DVD, tape, etc.. For PDS archives, the medium must be acceptable to PDS.

volume - one or several in a series of archive media containing data sets.

PDS - Planetary Data System. The primary organization within NASA responsible for the archive of planetary science data obtained from NASA sponsored missions. The PDS consists of a Central Node located at JPL and several Discipline Nodes located around the country.

MIFT - Mission Interface Team. Members include project, and PDS node personnel. The central node data engineer assigned to the project leads the team. The team plans the archive and develops the archive design. Regular meetings during production are used to coordinate peer review, and resolve issues.

1.5.2 Data Product Levels

The Cassini Program uses NASA levels for describing data products. The definition of each NASA level with examples and the CODMAC equivalent is in the below table.

Science Data Product	NASA Levels	Cassini Examples	CODMAC equivalent
Data stream as received at ground station	Raw	Digital Original Data Records, Intermediate Data Records	Level 1
Telemetry frame synchronized, any coding removed, and time-tagged data, invalid and redundant data discarded, data gaps accounted for (space-to-ground communications effects removed or accounted for)	Level 0	Instrument, Science, & Engineering Packets, Radio Science Subsystem (RSS) Archival Tracking Data File (ATDF)	Level 2
(Decompressed) data numbers (DN) translated into meaningful instrument data sets (e.g., instrument frames or cycles)	Level 1A	Multimission Image Processing System (MIPS) Unprocessed Data Record (UDR) (DN placed in image frame format), Radio Science Subsystem (RSS) Orbit Data File	Level 3
Calibrated (for instrument characteristics and geometry) physical units in geometrically labeled or referenced instrument frames/cycles (instrument measurement effects and spacecraft/instrument position and orientation effects removed or accounted for)	Level 1B	MIPS Experiment Data Record (EDR) (calibrated DN in image frame format) or - Level 1A with calibration files and algorithms and software to convert to level 1B	Level 4
Geophysical parameter units (underlying phenomena are measured) or interpretation enhancements such as re-sampling	Higher levels	Mosaics, contrast stretching, false color, movies, gravity fields, magnetic fields	Level 5

2. Roles and Responsibilities

2.1 Project Scientist

Provide a forum, led by a member of the PSG, for program internal peer review of PI and TL proposed data sets to be archived in the PDS.

2.2 Principal Investigators (PIs), Team Leaders (TLs)

- a) Generate, validate the science content and format, and archive reduced science data products, metadata, documentation, and algorithms and software used generate data products. Metadata includes Instrument, Dataset, Reference, and Personnel high-level catalog templates, ancillary data, and data product labels.
- b) Provide L1A and L1B data sets, with Radio Science producing L0 data sets to the project for PDS archiving. (The list of these data sets can be found in appendix A and B.)
- c) Work directly with assigned PDS discipline nodes to fine tune data set content and format. Discipline nodes have expertise in archiving specific types of data and will help define keywords and standard values for keywords in metadata such as a data set description file and data product label files.
- d) Participate in Mission Interface Team (MIFT) meetings.
- e) Report archive status to Instrument Operations (IO) monthly.

All of the above responsibilities, excluding the science validation of products, can be delegated to OTLs.

2.3 Interdisciplinary Scientists (IDSs)

Archive any significant new science data products and associated metadata and supplementary products created from the investigation. These will likely be higher level products and few in numbers. IDSs will inform IO of archive plans.

2.4 Instrument Operations (IO)

- a) Coordinate archive data set production schedule and Archive Plan for Science Data (699-068)
- b) Receive archive submissions from instruments and coordinate peer review with PDS.
- c) Act as agent between PDS, Project and PI and TL when necessary to resolve PDS format and delivery issues.
- d) Participate in Mission Interface Team (MIFT) meetings.
- e) Report archive status to program monthly.
- f) Generate and validate SPICE data products and documentation as specified in appendix B.
- g) Produce Instrument Host and Mission templates and provide to PDS.

2.5 Mission Support and Services Office (MSSO)

- a) Provide catalog system for archive data sets. (System should be capable of generating reports.)
- b) Perform project internal format data set validation prior to PDS peer review using PDS provided tools. Report status to IO.
- c) Produce SPICE archive data sets volumes. The list of these data sets can be found in appendix A and B.
- d) Work directly with NAIF PDS node to define SPICE archive volumes format. Discipline nodes have expertise in archiving specific types of data and will help define keywords and standard values for keywords in metadata such as a data set description file and data product label files.
- e) Report SPICE archive data set volume production status to IO.

2.6 Spacecraft Operations (SCO)

Generate and validate SPICE data products and documentation as specified in appendix B.

2.7 Planetary Data System (PDS)

Central Node:

- a) Coordinate with the Cassini program to define and produce the archive and ensure they are compatible with PDS standards.
- b) Maintain a database of catalog information of all PDS holdings, which will be updated after Cassini archive volumes have completed the peer review process.
- c) Distribute archive volumes to the NASA-supported science community, as funding permits.
- d) Maintain active archives of released Cassini products for access by the science community.
- e) Ensure copies of archive volumes are provided to the NSSDC.
- f) Provide and coordinate peer review of archive volumes.
- g) Provide archive volume validation tools, consultation, and review of validation reports.
- h) Provide training materials and instruction to archive volume producers.
- i) Lead Mission Interface Team (MIFT) meetings to discuss archive and PDS issues.

Discipline Nodes:

Work with archive producers assigned to them to define archive format and content.

2.8 National Space Science Data Center (NSSDC)

Maintain a “deep archive” of the data for long-term preservation. The NSSDC will also be responsible for filling large delivery orders to the science community and making data available to foreign investigators, educators, and the general public.

2.9 Cassini PDS Archive Locations

The following is a list of PDS Discipline Node managers and contacts.

PDS Node	Contact
Central Node JPL	Valerie Henderson valerie.henderson@jpl.nasa.gov
Atmospheres Node Archive Manager	Lyle Huber Lhuber@NMSU.edu
Atmospheres Node Manager New Mexico State University in Las Cruces	Reta Beebe rbeebe@nmsu.edu
Geosciences Node Earth and Planetary Remote Sensing Laboratory at Washington University in St. Louis, Missouri	Ray Arvidson arvidson@wunder.wustl.edu
Imaging Node USGS Subnode JPL Subnode	Eric Eliason eeliason@sirius.wr.usgs.gov Sue LaVoie Susan.K.LaVoie@jpl.nasa.gov
Planetary Plasma Interactions (PPI) Institute of Geophysics and Planetary Physics (IGPP) at the University of California, Los Angeles (UCLA).	Ray Walker rwalker@igpp.ucla.edu
Rings Node Ames Research Center	Mark Showalter showalter@ringside.arc.nasa.gov
Small Bodies Node University of Maryland	Mike A'Hearn ma@astro.umd.edu
Navigation and Ancillary Information Facility (NAIF) JPL	Charles Acton Charles.H.Acton-Jr@jpl.nasa.gov
Radio Science Subnode Stanford University	Dick Simpson rsimpson@magellan.stanford.edu

2.10 Cassini Principal Investigators and Team Leaders (PIs/TLs) Archive Contact

Instrument	PI or TL	Instrument Team Archive Representative
CAPS Cassini Plasma Spectrometer	David Young, PI	Judy Furman jfurman@swri.edu
CDA Cosmic Dust Analyzer	Eberhard Grun, PI	Sascha Kempf Sascha.Kempf@mpi-hd.mpg.de
CIRS Composite Infrared Spectrometer	Virgil Kunde, PI	Matt Elliott Matthew.H.Elliott@gsfc.nasa.gov Paul Romani Paul.N.Romani@gsfc.nasa.gov
INMS Ion and Neutral Mass Spectrometer	Hunter Waite, TL	Dana Burket dana@swri.edu
ISS Imaging Science Subsystem	Carolyn Porco, TL	Daniel "Buck" Janes janes@lpl.arizona.edu
MAG Magnetometer	David Southwood, PI	Steve Kellock S.Kellock@ic.ac.uk
MIMI Magnetospheric Imaging Instrument	Tom Krimigis, PI	Don Mitchell Don.Mitchell@jhuapl.edu
RADAR	Charles Elachi, TL	William K. Johnson Williamt.K.Johnson@jpl.nasa.gov
RPWS Radio and Plasma Wave Spectrometer	Don Gurnett, PI	Bill Kurth wsk@space.physics.uiowa.edu
RSS Radio Science Subsystem	Arv Kliore, TL	Randy Herrera Randy.Herrera@jpl.nasa.gov
UVIS Ultraviolet Imaging Spectrograph	Larry Esposito, PI	David Judd David.Judd@lasp.colorado.edu
VIMS Visual and Infrared Mapping Spectrometer	Robert Brown, TL	Rick McCloskey rickm@lpl.arizona.edu

2.11 Huygens Principal Investigator Archive Contacts

Instrument	PI	Team Archive Representative
HASI Huygens Atmospheric Structure Instrument	Marcello Fulchignoni Dept de Recherche Spatiale (DESPA), Observatoire de Paris-Meudon, France	Jean-Pierre Lebreton jlebreton@estec.esa.nl
GCMS Gas Chromatograph and Mass Spectrometer	Hasso B. Niemann Lab for Atmospheres, NASA/Goddard Space Flight Ctr, Balitimore USA	Jean-Pierre Lebreton jlebreton@estec.esa.nl
ACP Aerosol Collector and Pyrolyser	Guy M. Israel Service d'Aeronomie du CNRS, Verrieres-le-Buisson, France	Jean-Pierre Lebreton jlebreton@estec.esa.nl
DISR Descent Imager and Spectral Radiometer	Martin G. Tomasko Dept of Planetary Sciences, Lunar & Planetary Lab, Univ of Arizona, Tuscon USA	Jean-Pierre Lebreton jlebreton@estec.esa.nl
DWE Doppler Wind Experiment	Michael K. Bird Radioastronomisches Inst, Univ Bonn, Germany	Jean-Pierre Lebreton jlebreton@estec.esa.nl
SSP Surface Science Package	John Charles Zarnecki Unit for Space Sciences, Univ of Kent at Canterbury, UK	Jean-Pierre Lebreton jlebreton@estec.esa.nl

Archive Plan for Science Data, 699-068

2.12 Cassini MSSO SPICE Archive Contact

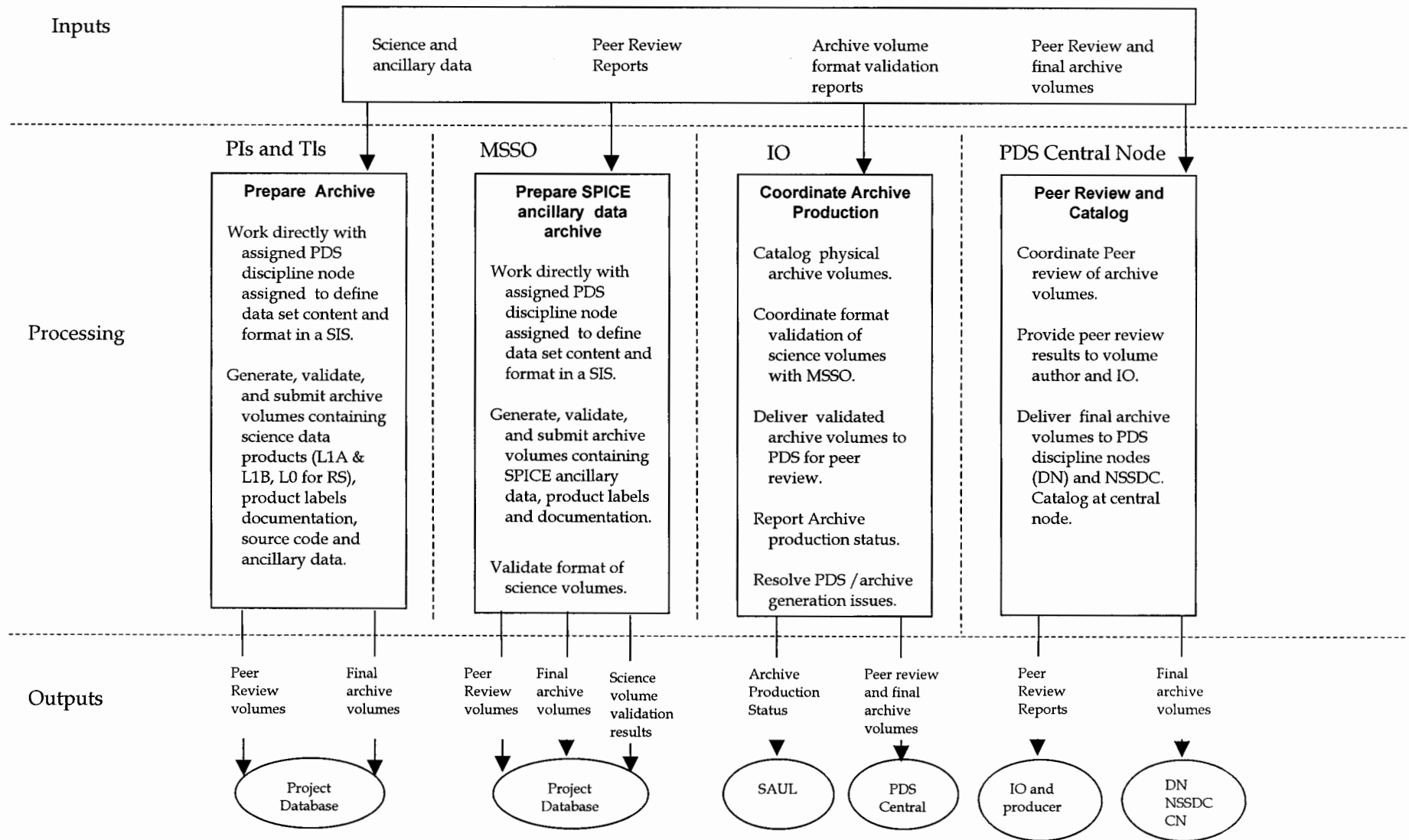
Dataset	Team	Archive Representative
SPICE	Greg Chin	TBD

2.13 PDS Discipline Nodes responsible for archiving Cassini data

Instrument	Primary Node	Other Nodes
CAPS	PPI	N/ A
CDA	Small Bodies	Rings, PPI
CIRS	Atmospheres	Rings
INMS	PPI	Atmospheres
ISS	Imaging	Rings, Geosciences, Atmospheres
MAG	PPI	N/ A
MIMI	PPI	Atmospheres
RADAR	Geosciences	Rings
RPWS	PPI	N/ A
RSS	Radio Science subnode	All
UVIS	Atmospheres	Rings
VIMS	Imaging	Rings, Atmospheres
Ancillary data, primarily SPICE	NAIF	
Huygens	Atmospheres	N/ A

Archive Plan for Science Data, 699-068

3. Archive Data Flow Diagram



Archive Plan for Science Data, 699-068

4. Archive Policies

The PDS standards version that was in place when the production of a volume set began will be used for all subsequent volumes in that set.

Archive datasets will be provided to PDS by the Project submitting two copies on CD-WO, (or other appropriate medium, possibly DVD), to the PDS Central Node (CN). The PDS Central Node will provide a timely peer review of the product. After successful peer review PDS will send one copy of the archive to the NSSDC for deep archive, thus ensuring availability of the data to the research community over the long term. The PDS Central Node will also provide the PDS Discipline Nodes copies of the archive volumes.

The Cassini program internal science data sharing will be accomplished by generating teams using policies set by the PSG. There is no intention for the program to provide PIs, TLs, or IDs CD-ROM volumes or electronic access to archived data during the mission.

The Cassini validation period and delivery schedule to PDS is in accordance with SMP, Section 5.

Level 1 data products for all investigations, except RSS (Level 0 for RSS), for science data generated during the cruise phase of the mission shall be delivered to the PDS no later than SOI+1 year. To meet this date, the development of the archive data structures in the form of detailed SISs are required by the project for submission to PDS at SOI-2 years. This will allow enough time to accommodate possible changes in processing software due to PDS non-compliant formats.

Ancillary data, such as SPICE files, that are used in the processing of archive products will be included on archive volumes.

Although not required, higher level products developed by PIs, TLs, and IDs may be archived into the PDS, if resources are available to do so. The Cassini Program recognizes that higher level products, described in section 5, are valuable and should be preserved, however funding restrictions may preclude the complete archiving of these products.

The Cassini Program will provide a regular forum for discussing archive progress and issues with the PDS, PIs, and TLs.

5. PDS High-Level Catalog Templates

PDS high-level catalog templates will accompany archive data sets. These templates are defined in JPL D-7669, Planetary Data System Standards Reference. These include: Instrument host, Mission, Instrument, Dataset, Reference, and Personnel templates.

IO will provide a draft version of the Instrument Host, and Mission templates to PDS at SOI-1 year. Updates to these templates will be provided at least every two years if new information is available, and final versions 2 months prior to end of mission.

6. Science Data Archive Products

6.1 Documentation

Documents that are relevant to understanding the archive such as the Software Interface Specifications (SISs), which define the format and content of data files are negotiated with PDS well before data products are generated. Instrument status reports will be included on archive volumes delivered to PDS.

6.2 Level 0 Data

Only Radio Science Level 0 data is archived with the PDS.

The Cassini program has a requirement to store Level 0 telemetry data (including engineering and housekeeping packets as well as science packets) through End-of-Mission + 1 year, which is done by MSSO. There is no commitment to archive this Level 0 telemetry data to PDS.

6.3 Level 1 Science Data Products

The Cassini Program is committed to archiving either the level 1A and level 1B products for all instruments except Radio Science. Level 1B products can be defined as level 1A products, calibration files, and source code and algorithms for applying calibration to level 1A products. Details are provided in Appendix A.

For the VIMS, ISS, and RADAR Facility Instruments, Level 1A products (and also Level 1B for Radar) are generated by IO. These products are produced by IO according to TL-approved Software Interface Specifications (SISs) and Operational Interface Agreements (OIAs). TLs are encouraged to negotiate with IO to use PDS formats for these products. If non-PDS formats are used, the TL will be required to reformat to PDS standards for archive. Whatever format is negotiated IO produced products are delivered to the TL for validation and archive volume generation. These volumes are submitted to the IO archive engineer for submission to the PDS.

6.4 Higher Level Science Data Products

Higher level science products are generated by PIs, TLs, and Interdisciplinary Scientists (IDSs).

Although not required, higher level products developed by PIs, TLs, and IDSs may be archived into the PDS, if resources are available to do so. The Cassini Program recognizes that higher level products are valuable and should be preserved, however funding restrictions may preclude the complete archiving of these products.

6.5 PIO/Press Release Data Products

PIO/Press Release products will be generated during the Cassini mission in accordance with documented Cassini/JPL/NASA policies and procedures for public information and press releases. The JPL Photolab will maintain press release products with copies distributed to the Regional Planetary Image Facility (RPIF)s. The JPL Public Information Office will maintain PIO products.

6.6 Ancillary or Supplementary Data Products

6.6.1 SPICE Products and NAIF Toolkit

The Mission Services and Support Office (MSSO) is responsible for generating the archive of SPICE datasets. Final versions of SPICE (SPK, PCK, IK, CK, EK, SCLK, and LSK) files will be archived on CD-WO discs (or other appropriate medium, possibly DVD) in IEEE binary format with accompanying documentation and NAIF Toolkit software. Since the latest version of the NAIF Toolkit is always backward compatible, the latest version of the toolkit will be included on archive volumes. The toolkit will be archived for all Cassini supported operating systems.

6.6.2 Uplink Data Products

The Mission Services and Support Office (MSSO) is responsible for the life-of mission storage of Cassini Uplink products. Uplink products will be archived in PDS in the SPICE EKernel format. If the SPICE EKernel is not available for any reason, uplink products will be archived in their place on CD-WO discs with appropriate SIS documentation, and will not be in PDS format.

Archive Plan for Science Data, 699-068

Appendix A. Science Data Sets for Archive to PDS

Instrument	Science Data Product	SIS ID	NASA Level	PDS Format	PDS Node	Produces data products	Creates archive and supplies to PDS	Estimated Data Set Size	COMMENTS
CAPS	Full calibrated data		1B	Yes	PPI Node	CAPS	CAPS PI		
CAPS	Averaged survey data		H	Yes	PPI Node	CAPS	CAPS PI		Higher level product
CDA	??		1A & 1B		Small Bodies Node	CDA	CDA PI		No input from instrument rep.
CIRS	Raw interferograms		1A	Yes	Atmospheres Node	CIRS	CIRS PI		
CIRS	Calibrated Spectra		1B	Yes	Atmospheres Node	CIRS	CIRS PI		
CIRS	Map products		H	Yes	Atmospheres Node	CIRS	CIRS PI		Higher Level product
INMS	Spectra		1B	Yes	PPI Node	INMS	INMS PI		this product is committed according to INMS Implementation Plan
ISS	UDR images		1A	Yes	Image Node	IO / ISS	ISS TL		generated by IO, delivered by ISS team
ISS	EDR images		1B	Yes	Image Node	ISS	ISS TL		

Archive Plan for Science Data, 699-068

Instrument	Science Data Product	SIS ID	NASA Level	PDS Format	PDS Node	Produces data products	Creates archive and supplies to PDS	Estimated Data Set Size	COMMENTS
ISS	Cartographic data products		H	Yes	Image Node	ISS	ISS TL		Higher Level product
MAG	L1A data (duplicates removed, gaps filled, idiosyncrasies of onboard data processing unit fixed, data separated into files by type)		1A	Yes	PPI Node	MAG	MAG PI		
MIMI	Survey File		1B	Yes	PPI Node	MIMI	MIMI PI		
MIMI	Snapshots		1B	Yes	PPI Node	MIMI	MIMI PI		
MIMI	Full data record		1B	Yes	PPI Node	MIMI	MIMI PI		
MIMI	Averaged data record		H	Yes	PPI Node	MIMI	MIMI PI		Higher Level product
RADAR	Decoded data (reversible, i.e. DN < - > EU)		1A	Yes	Geosciences Node	IO/Radar	Radar TL		product produced by IO (according to TL-approved SIS), delivered to Radar TL who in turn archives to PDS

Archive Plan for Science Data, 699-068

Instrument	Science Data Product	SIS ID	NASA Level	PDS Format	PDS Node	Produces data products	Creates archive and supplies to PDS	Estimated Data Set Size	COMMENTS
RADAR	Image calibrated records (SAR strips)		1B	Yes	Geosciences Node	IO/Radar	Radar TL		product produced by IO (according to TL-approved SIS), delivered to Radar TL who in turn archives to PDS
RADAR	Altimeter calibrated records		H	Yes	Geosciences Node	Cassini Radar Science Team (CRST)	Radar TL		Higher Level product
RADAR	Scatterometer calibrated records		H	Yes	Geosciences Node	CRST	Radar TL		Higher Level product
RADAR	Radiometer calibrated records		H	Yes	Geosciences Node	CRST	Radar TL		Higher Level product
RADAR	SAR Image Mosaics, etc.		H	Yes	Geosciences Node	CRST	Radar TL		Higher Level product
RADAR	Detailed science applications; topographic studies, etc.		H	Yes	Geosciences Node	CRST	Radar TL		Higher Level product
RSS	Open-loop radio science data (ODS) <i>digitized wave</i>		Raw	Yes	RS Subnode	IO/RS *	RST Lead		* produced by DSN, IO makes product available to RST. PDS labels generated by RST

Archive Plan for Science Data, 699-068

Instrument	Science Data Product	SIS ID	NASA Level	PDS Format	PDS Node	Produces data products	Creates archive and supplies to PDS	Estimated Data Set Size	COMMENTS
RSS	Closed-loop Tracking data (ATDF) <i>Doppler and range</i>		0	Yes	RS Subnode	Radiometric Data Conditioning Team (RMDCT)	RST Lead		PDS labels generated by RST
RSS	Orbit Data File (ODF) <i>Doppler and range</i>		1A	Yes	RS Subnode	RMDCT	RST Lead		PDS labels generated by RST
RSS	Radio Science Team Products (Calibrated, Resampled, & Derived datasets)		H	Yes	?	Radio Science Team (RST)	RST Lead		Higher Level product
RPWS	Low rate browse set		H	Yes	PPI Node	RPWS	RPWS PI		Higher Level product
RPWS	Low rate full resolution calibrated set		1B	Yes	PPI Node	RPWS	RPWS PI		
RPWS	Wideband browse set		H	Yes	PPI Node	RPWS	RPWS PI		Higher Level product
RPWS	Wideband full resolution uncalibrated set		1A	Yes	PPI Node	RPWS	RPWS PI		

Archive Plan for Science Data, 699-068

Instrument	Science Data Product	SIS ID	NASA Level	PDS Format	PDS Node	Produces data products	Creates archive and supplies to PDS	Estimated Data Set Size	COMMENTS
RPWS	Special Data Sets		H	Yes	PPI Node	RPWS	RPWS PI		Higher Level product
UVIS	Spectra		1B	Yes	Rings Node	UVIS	UVIS PI		
UVIS	Image at one wavelength		1B	Yes	Rings Node	UVIS	UVIS PI		
UVIS	Spatial and spectral cubes		H	Yes	Rings Node	UVIS	UVIS PI		Higher Level product
UVIS	Stellar brightness time history		H	Yes	Rings Node	UVIS	UVIS PI		Higher Level product
VIMS	MIPS UDR		1A	Yes	Image Node	IO / MIPS	VIMS TL		product produced by IO (according to TL-approved SIS), delivered to VIMS TL who in turn archives to PDS
Huygens	TBS								

H - Higher levels than Level 1B

Archive Plan for Science Data, 699-068

Appendix B: Supplementary Data Sets for Archive to PDS

Instrument or Team	Supplementary Data Product	PDS Node	Produces data products	Creates archive	PDS Format	COMMENTS
All Instruments	SPICE Spacecraft and Target Ephemeris Kernel (SPK)	NAIF	SCO	MSSO	Yes	
All	SPICE Planetary Constants Kernel (PCK)	NAIF	SCO	MSSO	Yes	
All	SPICE Spacecraft Clock Kernel (SCLK)	NAIF	SCO	MSSO	Yes	
All	SPICE Leapseconds Kernel (LSK)	NAIF	SCO	MSSO	Yes	
All	SPICE Event Kernel (EK) : ESP (Science Plan) ESQ (Sequence Component) ENS (Experimenter's Notebook)	NAIF	IO	MSSO	Yes	
All	SPICE Pointing Kernel (CK)	NAIF	SCO	MSSO	Yes	
CAPS	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	CAPS	Yes	
CAPS	Metadata		CAPS	CAPS	Yes	
CDA	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	CDA	Yes	
CDA	Metadata		CDA	CDA	Yes	
CDA	Calibration files		CDA	CDA	Yes	
CIRS	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	CIRS	Yes	

Archive Plan for Science Data, 699-068

Instrument or Team	Supplementary Data Product	PDS Node	Produces data products	Creates archive	PDS Format	COMMENTS
CIRS	Metadata		CIRS	CIRS	Yes	
CIRS	Calibration files		CIRS	CIRS	Yes	
CIRS	Software for end-user to derive target footprints from C-kernels		CIRS	CIRS	N/A	under consideration
INMS	SPICE Instrument / Frame Kernel (IK /FK)	NAIF	IO	INMS	Yes	
INMS	Metadata		INMS	INMS	Yes	
INMS	Calibration files		INMS	INMS	Yes	
ISS	SPICE Instrument / Frame Kernel (IK /FK)	NAIF	IO	ISS	Yes	
ISS	Metadata		ISS	ISS	Yes	
ISS	Calibration files		IO, ISS	ISS	Yes	
MAG	software to convert L1A to L1B		MAG	MAG	N/A	
MAG	SPICE Instrument / Frame Kernel (IK /FK)	NAIF	IO	MAG	Yes	
MAG	Metadata		MAG	MAG	Yes	
MAG	Calibration files		MAG	MAG	Yes	
MIMI	SPICE Instrument / Frame Kernel (IK /FK)		IO	MIMI	Yes	
MIMI	Metadata		MIMI	MIMI	Yes	
MIMI	Calibration files		MIMI	MIMI	Yes	

Archive Plan for Science Data, 699-068

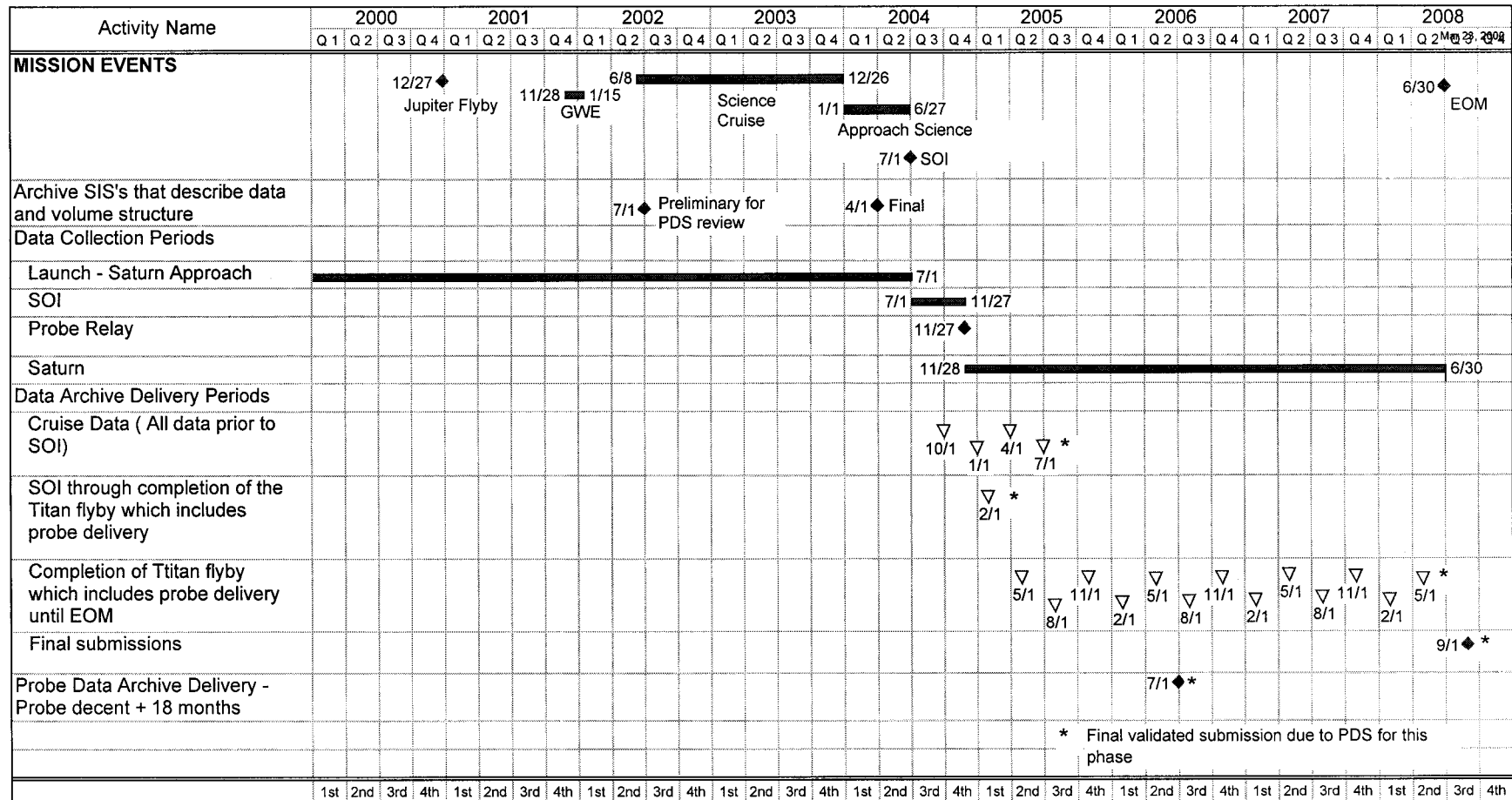
Instrument or Team	Supplementary Data Product	PDS Node	Produces data products	Creates archive	PDS Format	COMMENTS
RADAR	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	Radar	Yes	
RADAR	Metadata		Radar	Radar	Yes	
RADAR	Calibration files		IO, Radar	Radar	Yes	
RSS	Level 0 supplementary data products: <ul style="list-style-type: none"> - Universal Timing & Polar Motion File (UTPM) - Media Calibration File - Raw Weather - Advanced Media Calibration File - Earth Orientation Parameters File (EOP) 	RS Subnode	IO, TSAC (?)	RST	Yes	
RSS	Level 1 supplementary data products: <ul style="list-style-type: none"> - Advanced Media Calibration File - SPICE I & F Kernels - SPICE SPK Kernel - SPICE CK Kernel - Operations Logs & Reports - RFS/RFIS engineering telemetry 	RS Subnode	IO	RST	Yes	are "operations logs & reports" part of the EK (Experimenter's Notebook component)?
RSS	Higher Level supplementary data products <ul style="list-style-type: none"> - Ultrastable oscillator calibration data/reports - High Gain Antenna (HGA) Pattern - High Gain Antenna (HGA) Boresight Alignment 	RS Subnode	IO	RST	Yes	The HGA Boresight Alignment is part of the Frames kernel.

Archive Plan for Science Data, 699-068

Instrument or Team	Supplementary Data Product	PDS Node	Produces data products	Creates archive	PDS Format	COMMENTS
RPWS	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	RPWS	Yes	
RPWS	Metadata		RPWS	RPWS	Yes	
RPWS	Wideband full resolution calibration files		RPWS	RPWS	Yes	
UVIS	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	UVIS	Yes	
UVIS	Metadata		UVIS	UVIS	Yes	
UVIS	Calibration files		UVIS	UVIS	Yes	
VIMS	SPICE Instrument / Frame Kernel (IK / FK)	NAIF	IO	VIMS	Yes	
VIMS	Metadata		VIMS	VIMS	Yes	
VIMS	Calibration files		IO, VIMS	VIMS	Yes	
VIMS	software to convert L1A to L1B		IO, VIMS	VIMS	N/A	

Archive Plan for Science Data, 699-068

Appendix C. Archive Schedule



Appendix D: Acronyms

APSD	Archive Plan for Science Data (formerly known as the Archive Policy and Data Transfer Plan, APDTP)
CAPS	Cassini Plasma Spectrometer
CDA	Cosmic Dust Analyzer
CDS	Command and Data Subsystem
CIRS	Composite Infrared Spectrometer
CK	SPICE spacecraft orientation data
Co-I	Co-Investigator
COS	Cassini Operations System
DN	Data Number
DSN	Deep Space Network
ECR	Engineering Change Request
EDR	Experiment Data Record
EEIS	End-to-End Information System
EK	SPICE events information
ESA	European Space Agency
EU	Engineering Unit
FDD	Functional Design Document
FI	Facility Instrument
FRD	Functional Requirements Document
HK	Housekeeping
ID	Identifier
IDR	Intermediate Data Record
IDS	Interdisciplinary Scientist
IK	SPICE instrument Kernel
IO	Instrument Operations Team
IRD	Interface Requirements Document
INMS	Ion and Neutral Mass Spectrometer
ISS	Imaging Science Subsystem
JPL	Jet Propulsion Laboratory
LSK	SPICE leapseconds data
MAG	Magnetometer
MIFT	Mission Interface Team
MIMI	Magnetospheric Imaging Instrument
MIPS	Multimission Image Processing System
MO&DA	Mission Operations and Data Analysis
MOU	Memorandum of Understanding
MP	Mission Plan
MSSO	Mission Science and Support Operations
MSOC	Mission and Science Office Coordinator
NAIF	Navigation and Ancillary Information Facility
NASA	National Aeronautics and Space Administration

Archive Plan for Science Data, 699-068

NSSDC	National Space Science Data Center
OSSA	Office of Space Science and Applications
OTL	Operations Team Leader
PCK	SPICE target (planet, etc.) size, shape and orientation
PDMP	Project Data Management Plan
PDS	Planetary Data System
PI	Principal Investigator
PPRD	Program Policies & Requirements Document
RPIF	Regional Planetary Image Facility
RPWS	Radio and Plasma Wave Spectrometer
RST	Radio Science Team
RSS	Radio Science Subsystem
SAUL	Science and Uplink Office
S/C	Spacecraft
S/W	Software
SCLK	SPICE spacecraft clock coefficients
SFDU	Standard Formatted Data Unit
SIS	Software Interface Specification
SMP	Science Management Plan
SPICE	Spacecraft, Planet, Instrument, C-matrix, Events
SPK	SPICE Spacecraft and target (planet, etc.) ephemeris
SSR	Solid State Recorder
TL	Team Leader
TM	Team Member
UDR	Unprocessed Data Record
UVIS	Ultraviolet Imaging Spectrograph
VIMS	Visual and Infrared Mapping Spectrometer

Archive Plan for Science Data

Appendix E: To be Resolved List

Unresolved Items	Comments	Due Date
1. A commitment is needed from all teams to archive 1A and 1B products		
2. A MSSO PDS rep needs to be identified.	Section 2	
3. Should the assimilation of the SPICE data archive be allocated to another team?	It is currently allocated to MSSO. A team with more SPICE experience and expertise may be a better match.	
4. Should Geosciences be listed as an "other node" for receipt of CIRS data?	(PDS node for surface data to icy satellites-down to the surface of Titan, or just real close.) Section 5.2	
5. Is there a formal interface between Cassini & Regional Planetary Imaging Facilities (RPIFs)?		
6. SIS ID and data set size information needs to be provided	Appendix A	
7. Clarify arrangement between CDA instrument and PDS Small Bodies Node (Dust Subnode). How is data delivered, what format, what is PDS responsibility?	Appendix A	
8. include SIS ID, data formats and structure, volume id/set names, etc. in Appendix A		
9. Incorporate details on Huygens archive products and representatives.		

Archive Plan for Science Data

Resolved Items	Comments	Due Date
1. policy concerning Cassini "validation period"	Defined in SMP, also see section 4.	
2. Does Instrument Operations Team generate the program-wide catalog templates? Should there be a commitment to update catalog templates more frequently than every two years as written here?	See Section 2.4	
3. Will sequence products be archived by PDS NAIF node, or is E-kernel sufficient?	See section 6.6	
4. Add information about process for retaining control of archive production & validation	See dataflow diagram in section 3.	
5. Question: which nodes will archive ISS data other than the PDS Image node?	Section 2.13	
6. What is NSSDCs role? Does NSSDC "fill large delivery orders to the science community"?	See section 2.8	
7. Higher level products identified for archive in Appendix A -- is this consistent with PDMP archive policy? (I.e. are these the products generated for program requested publications? if not, who is supplier?)	See section 4.	
8. identify PDS node that will archive each of the ancillary products	Ancillary products will accompany datasets and go to NAIF node. see sections 4 and 6.1	
9. include Validation periods in Archive Schedule	Validation period is from the time data is acquired until the due date in Appendix C	
10. include process/flow diagram showing archive from Teams of the Science Operations Office to PDS nodes	See section 3 dataflow diagram.	
11. Is it true that MSSO or instrument team sends archive volumes to PDS CN, or do they get sent to DNs? Are templates sent direct to DN or to CN? Who forwards the volumes to NSSDC?	IO sends volumes to PDS. See data flow in section 2 and roles and responsibilities in section 2.	
12. What is archive medium? CD-WO, DVDs, other?	See section 1.5.1.	
13. policy concerning science data taken during cruise	see section 4. Also resolved in SMP.	

Archive Plan for Science Data

14. do Level 0 records (i.e. science and housekeeping packets) get archived after life of mission? what is the requirement? where is this archive maintained (PDS, NSSDC, JPL organization?)	No requirement. see section 4. (Transfer frames are archived during the life of the mission, not packets)	
15. Data set supplier needs to be identified for each dataset .	See appendix A.	
16. what needs to get archived to JPL archives? only documentation as described in section 4.1?	Covered in a separate document.	

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